

Supporting information for

Telomerase-Activated Au@DNA Nanomachine for Targeted Chemo-Photodynamic Synergistic Therapy

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1. Materials

Tetrachloroauric acid was purchased from Tianjin Dagu Chemical Co., Ltd., doxorubicin hydrochloride was purchased from Aladdin Reagent Co., Ltd., RNase inhibitor, telomerase inhibitor epigallocatechin gallate (EGCG), thiazole blue (MTT) and dimethylene sulfone (DMSO), 4',6-diamidino-2-phenylindole (DAPI), 2',7'-Dichlorodihydrofluorescein diacetate (DCFH-DA) were purchased from Shanghai Biyuntian Biological Technology Co., Ltd., benzylsulfonyl fluoride (PMSF), sodium citrate, tris(2-carboxyethyl) phosphine (TCEP), sodium chloride, hydrochloric acid, sodium hydroxide and tris-base were purchased from Sigma-Aldrich, DMEM medium, MEM medium, fetal bovine serum, penicillin, streptomycin and 4% cell tissue fixation solution were purchased from Tianjin Erad Trading Co., Ltd. Sgc8-apt sequence was synthesized by Takara Engineering (Dalian) Co., Ltd., and the remaining DNA sequences were purified and synthesized by Shanghai Sangon Biological Co., Ltd. through high performance liquid chromatography (HPLC). The relevant base sequences are shown in Table 1.

2. Instruments

Ultra-purity water preparation equipment (Aipur 2S type) for obtaining ultra-purity water; transmission electron microscope (2100F, Japan Electronics Co., Ltd.) for analyzing particle size and taking transmission pictures; ultraviolet-visible spectrophotometer (UV-1800 Type, Shanghai Precision Instrument Co., Ltd.) for obtaining absorbance curves; fluorescence spectrophotometer (RF-5301PC, Shimadzu, Japan) for obtaining fluorescence curves; nanometer particle size and potential analyzer (ZS90, Malvin, UK) was used to test the hydration diameter and zeta potential of materials; laser scanning confocal microscope (TCS SP8, Leica, Germany) for cell imaging; multifunctional microplate reader (Synergy 4 type, BioTek) for analysis of cell viability under different conditions.

3. Feasibility study of activated system through fluorescence experiments

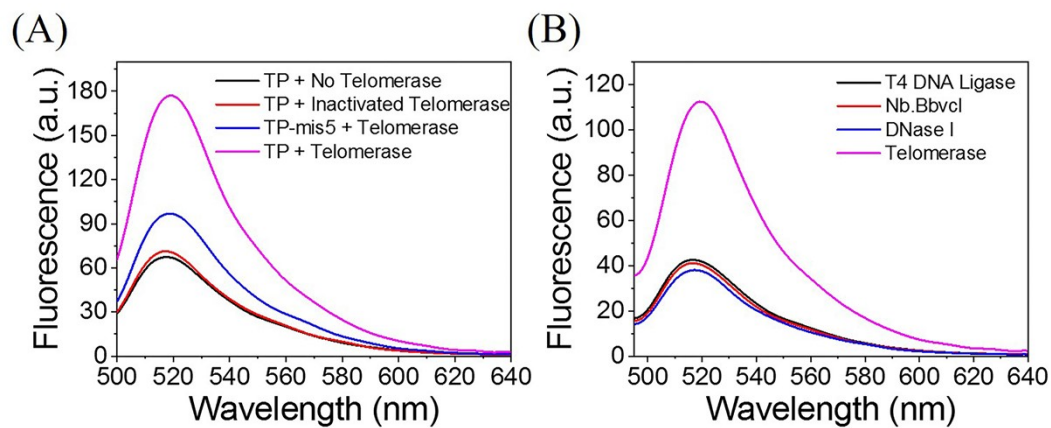


Figure. S1 The feasibility of activated system. (A) Fluorescence curve of the system with or without telomerase. (B) Specificity experiments with different enzymes added.

4. Feasibility study of activated system through intracellular inhibitory experiments

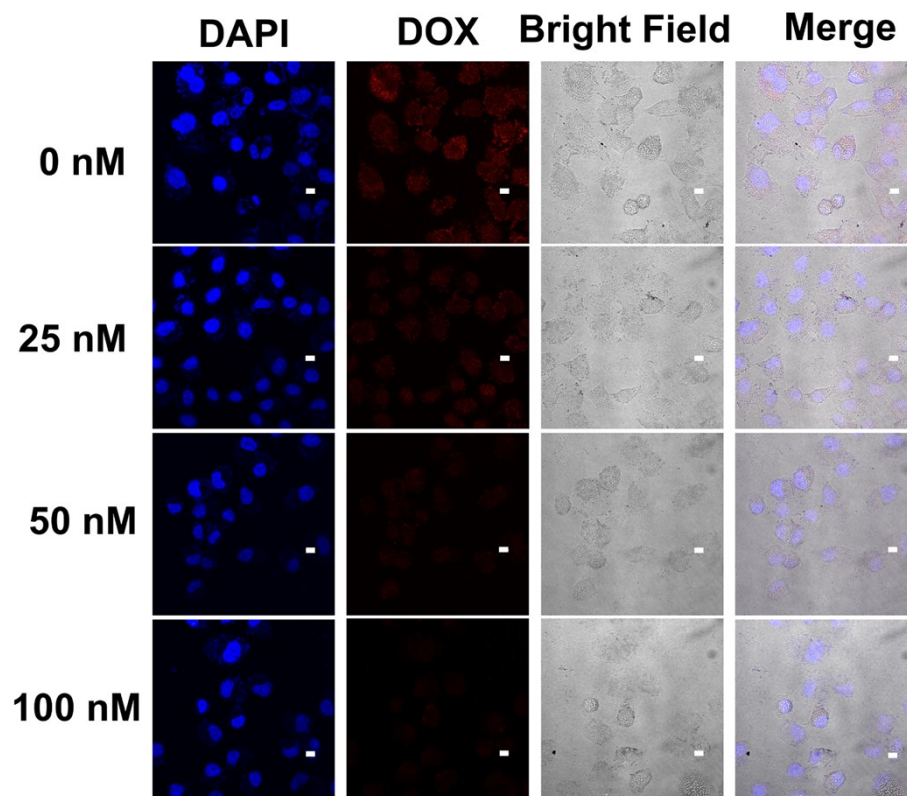


Figure. S2 0 nM, 25 nM, 50 nM and 100 nM telomerase inhibitor EGCG pre-treated HeLa for 48 h and incubated with 3 nM Au@DNA-DOX for 3 h for fluorescence confocal imaging. Scale bar is 20 μm .

5. Feasibility study of activated system through TP sequence mismatched or not

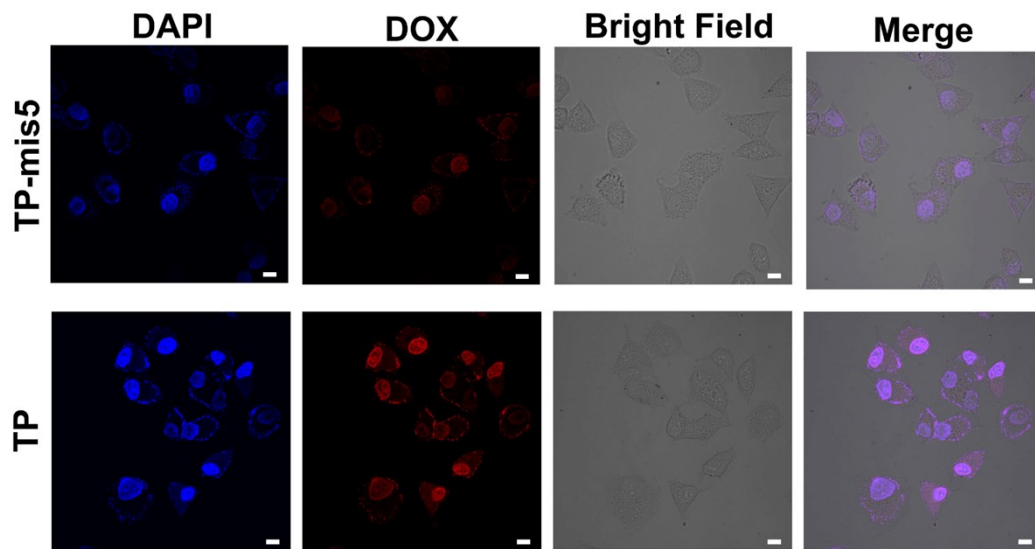


Figure. S3 Comparison of fluorescence confocal images of 3 nM Au@DNA-DOX constructed with TP-mis5 or TP. Scale bar is 10 μ m.

6. Targeted confocal fluorescence imaging

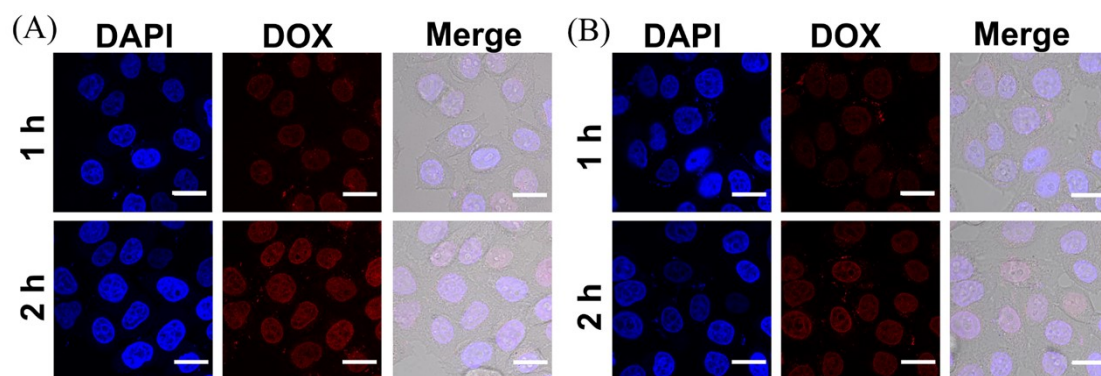


Figure. S4 (A) Confocal fluorescence imaging of Au@DNA-DOX with Sgc8 aptamer incubated with HeLa for 1 h and 2 h. Scale bar is 20 μm. (B) Confocal fluorescence imaging of Au@DNA-DOX without Sgc8 aptamer incubated with HeLa for 1 h and 2 h. Scale bar is 20 μm.

7. Confocal fluorescence imaging of HeLa or HEK293 incubated with pure DOX

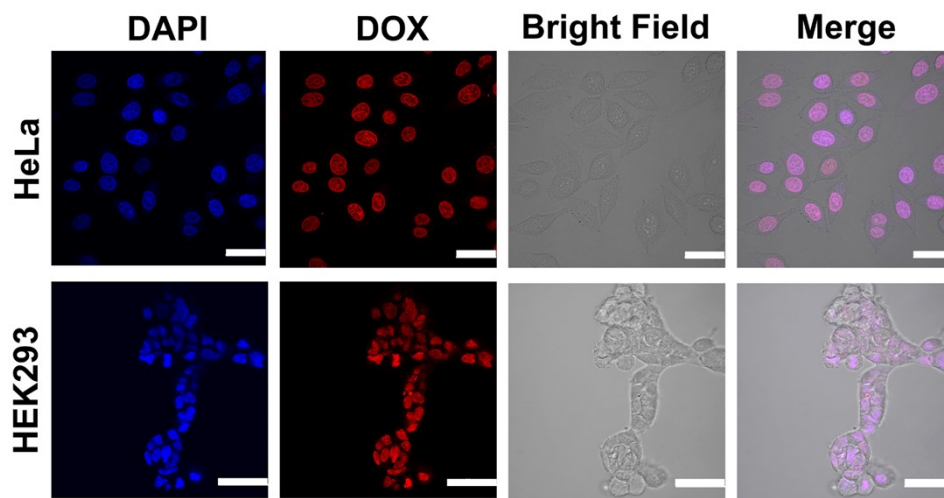


Figure. S5 Confocal fluorescence imaging of 2 μM pure DOX incubated with HeLa cells or HEK293 for 1 h. Scale bar is 50 μm .

8. Confocal fluorescence imaging of Ce6 in HeLa

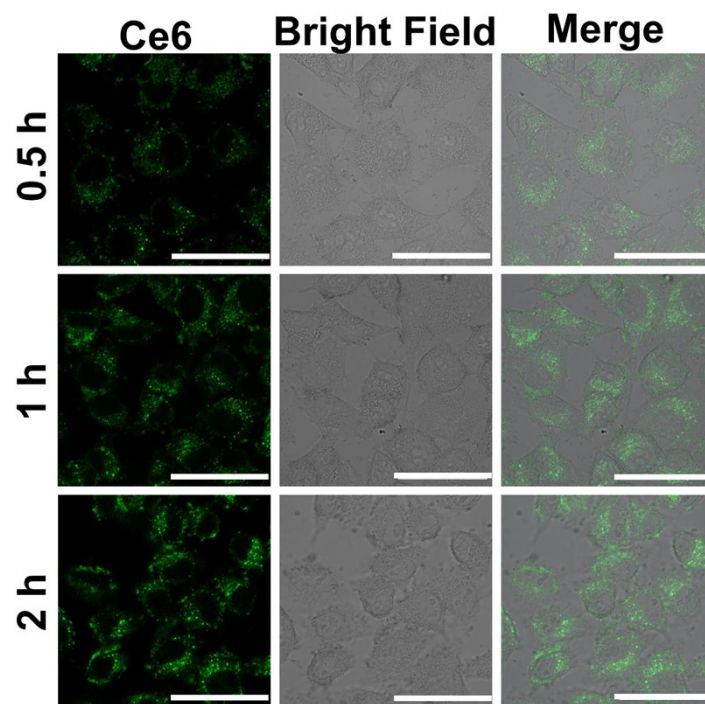


Figure. S6 Confocal fluorescence imaging of HeLa incubated with 3 nM Au@DNA for 0.5 h, 1 h and 2 h. Scale bar is 50 μm .